NAVY CBRN RESPIRATOR PROGRAM FOR FIRST RESPONDERS

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We live in times when terrorist attack is a distinct possibility.

Terrorist events of the recent past emphasize that the Navy needs a sound Emergency Management Plan established to respond to a CBRNE event on a Navy installation.

Terrorist use of chemical or biological warfare agents is a viable threat. Exposure to these warfare agents produces horrific results.

MUSTARD AGENT

Named after its characteristic odor.

Navy policy requires that our first responders wear CBRN respirators approved by NIOSH. NIOSH CBRN approved respirators have passed the "Gold Standard" by which we are confident that our first responders will be protected.

Mustard gas was used during WWI to blister the skin, eyes, and lungs.

NAVY SHORE INSTALLATION EMERGENCY MANAGEMENT PROGRAM
OPNAVINST 3440.17 and CNI 3440.17

Sets forth Navy policy for establishing and implementing *Emergency Management Plans* for Navy installations.

Installation *Emergency Management Plans* establish MOAs with first responders and other services to respond, mitigate, and implement recovery from all man-made and natural emergencies.

Three Steps to develop *Emergency Management Plans* are listed below:

Step (1) Regional and Installation Commanders must ensure that *Emergency Management Capability Assessments* have been completed.

These assessments evaluate an installation's ability to respond to a threat/hazard and to be classified as either Group I, II, or III Installations.

NAVY SHORE INSTALLATION EMERGENCY MANAGEMENT PROGRAM
OPNAVINST 3440.17 and CNI 3440.17

Step (2) Based on their *Emergency Management Capability Assessments,* Group I and II Installations develop *Implementation and Transition Plans* with CNI.

Group III Installation response is dependent primarily upon State and Local agencies for first response.

Step (3) Based on their *Implementation and Transition Plans* developed with CNI, Group I and II Installations develop their *Emergency Management Plans.*

NAVY SHORE INSTALLATION EMERGENCY MANAGEMENT PROGRAM
OPNAVINST 3440.17 and CNI 3440.17

By completing the emergency assessment and emergency management planning processes, CBRN RPPMs and their assistants will be identified along with all emergency response personnel and their respiratory protection requirements starting with the Regional and Installation Emergency Management Officers, Incident Commanders down through the whole hierarchy of the plan.

Navy Occupational Safety and Health Program Manual
OPNAVINST 5100.23G

Chapter 15 contains the Navy Industrial Respirator Program, which includes:

Respiratory Protection Program Manager (RPPM) – RPPM must have written appointment by Commanding Officer and training.

Written Standard Operating Procedures – includes worksite SOPs

Respirator Selection – only NIOSH approved respirator allowed

Medical Evaluation – Per NAVENVIRHLTHCEN Occupational Medical Surveillance Procedures Manual and Medical Matrix – Both initial and age

OPNAVINST 5100.23G
Chapter 15 Industrial Respirator Program continued

Fit Testing – Initial and annual per Appendix A of 29 CFR 1910.134 and ANSI Z88.10

Respirator Cleaning and Inspection

Cartridge Change Out Schedules

Breathing Air Quality – Quarterly test compressed air sources quality

Special Problems – No facial hair; do allow contact lenses

Record Keeping

OPNAVINST 5100.23G
Chapter 26, CBRNE

The CBRN Respiratory Protection Program includes all elements of the industrial respirator program requirements of Chapter 15.

Chapter 26 contains additional CBRN requirements for:

- respirator selection
- respirator use and limitations
- respirator inspection, cleaning, and decontamination
- respirator training
- fit testing
- program evaluation
- respirator cartridge change out schedules

OPNAVINST 5100.23G
Chapter 26, CBRNE

The RPPM having cognizance over the first responders will be assigned as the CBRN RPPM.

CBRN RPPMs may have as many additional assistants as required to implement all of the additional program requirements brought about by their taking on the CBRN Respirator Program

All of the prerequisite requirements for wearing respiratory protection including medical evaluation, respirator selection, fit testing, and training, must be completed prior to responding to a CBNR incident.

OPNAVINST 5100.23G, Chapter 26, CBRNE RESPIRATOR SELECTION

Level A

Interim Policy - NIOSH CBRN approved SCBA are the first choice of respiratory protection.

Since SCBA will be worn under Level A encapsulating suits, NIOSH approved SCBA meeting NFPA 1981 requirements may also be worn.

Final Policy - Once activities are fully equipped with NIOSH CBRN approved SCBA, then these respirators will be the only respirators allowed for use.

The minimum air cylinder service life will be rated at 60 minutes

OPNAVINST 5100.23G, Chapter 26, CBRNE RESPIRATOR SELECTION
Level B

Interim Policy - SCBA will be selected on a case by case basis depending on the presence of liquid chemical warfare agent.

When liquid agent is present then only NIOSH CBRN agent approved SCBA are permitted to be worn.

If liquid agent is not present, then NIOSH CBRN agent approved SCBA are the first choice of SCBA, however, use of NIOSH approved SCBA meeting NFPA 1981 requirements is permissible.

Final Policy - Once activities are fully equipped with NIOSH CBRN approved SCBA, then these respirators will be the only respirators

OPNAVINST 5100.23G, Chapter 26, CBRNE RESPIRATOR SELECTION

Level C

Navy first responders shall be issued NIOSH CBRN agent approved air-purifying respirators.

The MSA Millennium respirato
(TC-14G-0270) is the first choi
of
Level C respiratory protection

The MSA Millennium and the
Navy's military gas masks (MC
2A/P) are almost identical
respirators.

OPNAVINST 5100.23G, Chapter 26, CBRNE RESPIRATOR SELECTION

MTF Secondary Decontamination Stations and Decontamination Corridor Security

Until NIOSH CBRN approved PAPR are available, personnel assigned to secondary decontamination stations at MTFs and security personnel stationed at the decontamination corridor wear full-face rubber, PAPRs equipped with combination organic vapor, acid gas and HEPA filters.

OPNAVINST 5100.23G, Chapter 26, CBRNE RESPIRATOR SELECTION
Level D

MSA *Safe Escape Respirator*

ILC DOVER's *SCape CBRN30*

NIOSH CBRN approved escape respirators may be issued when applicable for Level D protection.

Currently NIOSH CBRN approved escape respirators are air-purifying devices and do not provide oxygen and therefore will not provide protection against oxygen deficient atmospheres.

OPNAVINST 5100.23G, Chapter 26, CBRNE RESPIRATOR SELECTION

The use of MOPP gear including military gas masks (e.g., M40A1 or MCU-2A/P) by overseas' Navy personnel when directed by the Combatant Commander, is the only permissible use of military gas masks by first responders.

Warning: C2A1 canisters do not provide protection against several toxic industrial chemicals (TICs), such as ammonia, carbon monoxide, carbon dioxide, nitric oxide, nitrogen dioxide and metal carbonyls.

OPNAVINST 5100.23G, Chapter 26, CBRNE Respirator Use And Limitations

NIOSH CBRN Approved SCBA

NIOSH CBRN approved SCBA shall not be used beyond 6 hours after initial exposure to chemical warfare agents to avoid possibility of agent permeation.

NIOSH CBRN Approved GAS MASKS

NIOSH CBRN approved air-purifying respirators shall not be worn into IDLH atmospheres or atmospheres containing less than 19.5% oxygen.

They must not be used beyond eight (8) hours after initial exposure to chemical warfare agents to avoid possibility of agent permeation.

If liquid exposure is encountered, the respirator shall not be used for more than two (2) hours.

OPNAVINST 5100.23G, Chapter 26, CBRNE Respirator Inspection, Cleaning, And Decontamination

Since CBRN respirators are worn for emergency use all will be inspected monthly according to manufacturer's instructions and a written inspection record will be maintained for the life of the respirator.

Employees shall inspect their respirators for serviceability prior to donning them.

Respirators exposed to CBRN contaminants must be properly decontaminated per *NFPA Hazardous Material Response Handbook, Supplement 10, Guidelines for the Decontamination of Firefighters and Their Equipment following Hazardous Material Incidents, 1997.*

CBRN Respirator Training
1ST Responders, Their Supervisors, and Respirator Issuers

Respirator training is based on the training elements listed in Section 1511 as they specifically relate to wearing respirators during first response to a CBRN incident.

a. The nature and degree of respiratory hazards.
b. Respirator selection based on specific hazards.
c. Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
d. The limitations and capabilities of the respirator.
e. How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.
f. How to inspect, put on and remove, use and check the seals of the respirator.
g. The procedures for maintenance and storage of the respirator.
h. How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.
i. Wearing contact lenses in contaminated atmospheres with respiratory protection is permitted.
j. Know when to change chemical cartridges/canisters according to the established change out schedule.
k. The general requirements of the respiratory standard.

Additional first responder training requirements are provided in Appendix B of 29 CFR 1910.120 and CNI 3440.17.

CBRN Respirator Training
CBRN RPPM

Respirator training for CBRN RPPMs is based on the required RPPM training elements listed in Section 1512 as specifically related to wearing respirators during first response to a CBRN incident.

(a) Respiratory hazards.
(b) Federal standards applicable to respirators.
(c) Minimum respiratory protection program requirements and administration.
(d) Respirator types, selection, certification, and limitations.
(e) Respirator cleaning, maintenance, and inspection.
(f) Quantitative fit testing of respirators, including actual laboratory fit testing.
(g) Breathing air quality.
(h) Medical considerations.
(i) Respirator training.
(j) Confined spaces/IDLH atmospheres.
(k) Special problems in program administration (facial hair, lens fogging, and communication).
(l) Standard operating procedures.
(m) Cartridge change out schedules.

NAVENVIRHLTHCEN developed CBRN respirator training for first responders and CBRN RPPMs. The NAVOSHENVTRACEN will incorporate this training in their 40 hour RPPM

OPNAVINST 5100.23G, Chapter 26, CBRNE
Fit Testing

Personnel wearing tight-fitting respirators shall be quantitatively fit tested by activities initially and annually thereafter according to the OSHA accepted quantitative fit testing methods and procedures set forth in Appendix A of 29 CFR 1910.134.

Positive pressure respirators will be fit tested in the negative pressure mode by either converting the facepiece into a negative pressure air-purifying respirator or using a surrogate negative-pressure air-purifying respirator made by the same manufacturer and having identical sealing surfaces and facepiece materials.

Employees shall not be fit tested unless they have been medically evaluated.

OPNAVINST 5100.23G, Chapter 26, CBRNE Respirator Medical Evaluations

Military personnel, who have been confirmed by their region or activity as *"having no deployment limiting medical conditions,"* and with a current annual Preventive Health Assessment per OPNAVINST 6120.3, are considered qualified to wear any type of respiratory protection.

Civilian first responders will be medically evaluated per the Medical Surveillance Procedures Manual/Medical Matrix, which meets the requirements of the OSHA Respirator Standard.

Medical evaluation is age dependent:

under 35 35-45

over 45

5 yrs 2 yrs

OPNAVINST 5100.23G, Chapter 26, CBRNE Program Evaluation

Besides Chapter 15 program audit requirements, the Incident Safety Officer will conduct frequent inspections of the incident site to ensure that the correct respirators are being used, are being worn properly and are in good working condition.

The Incident Safety Officer will convey this information to the CBRN RPPM, who will maintain a record of inspection dates and findings.

OPNAVINST 5100.23G, Chapter 26, CBRNE Respirator Cartridge Change Out Schedules

In the absence of industrial hygiene air sampling data:

* Respirator cartridges used by security guards must be changed after every 8-hour shift.

* PAPR cartridges used by personnel assigned to secondary decontamination stations at medical treatment facilities and by security guards stationed at the decontamination corridor must be changed every 2.5 hours.

More detailed information on respirator cartridge change out schedules, including a method for validating estimated change out schedules, is provided on the Navy Environmental Health Center

OPNAVINST 5100.23G, Chapter 26, CBRNE Respirator Cartridge Change Out Schedules

Currently all NIOSH CBRN agent approved gas masks achieved CAP 1 approval, in which their service life must last for 15 minutes against the contaminants at the concentrations shown in the table below.

Representative Test Agent	Challenge Concentration (ppm)	IDLH Concentration (ppm)	Breakthrough Concentration
Cyclohexane	2600	1300	10
Sulfur dioxide	1500	100	5
Hydrogen sulfide	1500	100	5
Cyanogen Chloride	300	ND NIOSH Ceiling 0.3	2
Phosgene	250	2	1.25
Hydrogen Cyanide	940	50	4.7

OPNAVINST 5100.23G, Chapter 26, CBRNE Respirator Cartridge Change Out Schedules

The challenge concentrations for the 15 minute CBRN approvals are above the IDLH concentrations (in most cases the challenge concentration is considerably above the IDLH concentration). Since these CAP 1 respirators are not allowed to be worn in IDLH atmospheres, their service life will be considerably longer than 15 minutes in atmospheres less than IDLH.

OSHA has a rule of thumb related to increased service life caused by decreased concentration. This rule of thumb states that "Reducing workplace concentration by a factor of 10 will, in general, increase service live by a factor of five."

Example: If canister lasts 15 minutes at 2600 ppm cyclohexane, then it should last 75 minutes at 260 ppm, 375 minutes at 26 ppm, and 1875 minutes at 2.6 ppm.

OPNAVINST 5100.23G, Chapter 26, CBRNE Respirator Cartridge Change Out Schedules

The complete Millennium respirator assemblage (including canister) must also have a minimum service life of at least eight hours against an initial 210 mg/m^3 Sarin (GB) vapor challenge and a 50 mg/m^3 Distilled Sulfur Mustard (HD) vapor and must have at least a two hour service life against 0.860 milliliters liquid HD.

The USACHPPM Summary of Chemical Agent Air Exposure Values of 8/03/04 indicates that the IDLH concentrations of HD and GB are 2 and 0.1 mg/m^3, respectfully.

Doing the math for the OSHA rule of thumb *"Reducing workplace concentration by a factor of 10 will, in general, increase service live by a factor of five,"* for Sarin and Mustard vapor shows that the service life against these chemical warfare agents below the IDLH concentration greatly exceeds 8 hours.

However, being conservative, canisters will be changed after eight hours, two hours if liquid agent is present.

Questions?